SEL-787Z High-Impedance Differential Relay

Standard Features

Protection

- High-Impedance Differential
- Overcurrent
- Under/Over Voltage

Hardware

- 3-Phase AC Current and Voltage Inputs
 - Slot Z
- Neutral AC Current Input
 - Slot Z
- 2 Digital Inputs (DI)
 - Slot A
- 3 Digital Outputs (DO)
 - Slot A
- IRIG-B Time Code Input
 - Slot B
- Multimode Fiber ST (Port 2)
 - Slot B

Human Machine Interface (HMI)

- Display
- 8 Programmable Pushbuttons With Two Tri-Color LEDs each
- 8 Target Tri-Color LEDs (6 Programmable)
- · Operator Control Interface
- EIA-232 Port (Port F)
- Multi-Language Support

Protocols

- Modbus RTU
- SEL ASCII and Compressed ASCII
- SEL Fast Meter, Fast Operate, Fast SER
- SEL Fast Message
- Ymodem File Transfer
- SEL MIRRORED BITS Communications

Other

- ACSELERATOR QuickSet SEL-5030 Software
- User Configurable Labels

Part Number:	0	7	8	7	Z	0												0	L	
User Interface																				
English Language Support							0													
Spanish Language Support							S													
Slot A Power Supply Voltage	Slo	t A	Di	git	tal :	Inp	ut	Vc	lta	age	e									
110-250 Vdc (110-240 Vac) 125 Vdc/Vac							1		Д											
110-250 Vdc (110-240 Vac) 24 Vdc/Vac							1		В											
110-250 Vdc (110-240 Vac) 48 Vdc/Vac							1		С											
110-250 Vdc (110-240 Vac) 110 Vdc/Vac							1		D											
110-250 Vdc (110-240 Vac) 220 Vdc/Vac							1	. (G											
110-250 Vdc (110-240 Vac) 250 Vdc/Vac							1		Н											
24-48 Vdc 125 Vdc/Vac							2	2 /	Д											
24-48 Vdc 24 Vdc/Vac							2	2	В											
24-48 Vdc 48 Vdc/Vac							2	2 0	С											
24-48 Vdc 110 Vdc/Vac							2	2 1	D											
24-48 Vdc 220 Vdc/Vac							2	2 (G											
24-48 Vdc 250 Vdc/Vac							2	2	Н											
Front Panel																				
2x16 LCD With 8 Pushbuttons															0					
5 in Color Touchscreen With 8 Pushbuttons															Α					

Slot B Ethernet (Port 1) | Rear Serial Port (Port 3)

None EIA-232	0
None EIA-485	1
Single 10/100BASE-T EIA-232	2
Single 10/100BASE-T EIA-485	3
Single 100BASE-FX MM LC EIA-232	4
Dual 10/100BASE-T EIA-232	6
Dual 100BASE-FX MM LC EIA-232	8

IEC 61850 Protocol | DNP3 Protocol | IEC 60870-5-103 Protocol | EtherNet/IP Protocol

o IEC 61850 and EtherNet/IP available o	only for models with Ethernet options in Slot B	
None		0
IEC 61850 Protocol		1
DNP3 Protocol		2
IEC 61850 Protocol DNP3 Protocol		3
IEC 60870-5-103 Protocol		4
IEC 61850 Protocol IEC 60870-5-103 Protocol		5
DNP3 Protocol IEC 60870-5-103 Protocol		6
IEC 61850 Protocol DNP3 Protocol IEC 60870-5-103 Protocol		7
EtherNet/IP Protocol		8
IEC 61850 Protocol EtherNet/IP Protocol		9
DNP3 Protocol EtherNet/IP Protocol		Α
IEC 60870-5-103 Protocol EtherNet/IP Protocol		В
IEC 61850 Protocol DNP3 Protocol EtherNet/IP Protocol		С
IEC 61850 Protocol IEC 60870-5-103 Protocol EtheNet/IP Protocol		D
DNP3 Protocol IEC 60870-5-103 Protocol EtherNet/IP Protocol		E
IEC 61850 Protocol DNP3 Protocol IEC 60870-5-103 Protocol EtherNet/IP Protocol		F

Slot C | Slot C Digital Input Voltage o Only one (1) 3 DI / 4 DO / 1 AO card per chassis o Only one (1) 4 AI / 4 AO card per chassis

Empty	0 X	
Serial Communications (EIA-232/485)	A 0	
3 DI / 4 DO / 1 AO (4-20 mA Range) 125 Vdc/Vac	BA	
3 DI / 4 DO / 1 AO (4-20 mA Range) 24 Vdc/Vac	ВВ	
3 DI / 4 DO / 1 AO (4-20 mA Range) 48 Vdc/Vac	ВС	
3 DI / 4 DO / 1 AO (4-20 mA Range) 110 Vdc/Vac	BD	
3 DI / 4 DO / 1 AO (4-20 mA Range) 220 Vdc/Vac	BG	
3 DI / 4 DO / 1 AO (4-20 mA Range) 250 Vdc/Vac	ВН	
4 DI / 4 DO Electromechanical 125 Vdc/Vac	1 A	
4 DI / 4 DO Electromechanical 24 Vdc/Vac	1 B	

4 DI / 4 DO Electromechanical 48 Vdc/Vac		1 0
4 DI / 4 DO Electromechanical		1 D
110 Vdc/Vac 4 DI / 4 DO Electromechanical		
220 Vdc/Vac		1 G
4 DI / 4 DO Electromechanical 250 Vdc/Vac		1 H
4 DI / 4 DO Fast High Current Hybrid 125 Vdc/Vac		CA
4 DI / 4 DO Fast High Current Hybrid 24 Vdc/Vac		СВ
4 DI / 4 DO Fast High Current Hybrid 48 Vdc/Vac		CC
4 DI / 4 DO Fast High Current Hybrid		CD
110 Vdc/Vac 4 DI / 4 DO Fast High Current Hybrid		CG
220 Vdc/Vac		
4 DI / 4 DO Fast High Current Hybrid 250 Vdc/Vac		CH
4 DI / 3 DO Electromechanical		DA
(2 Form C, 1 Form B) 125 Vdc/Vac 4 DI / 3 DO Electromechanical		DB
(2 Form C, 1 Form B) 24 Vdc/Vac		
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 48 Vdc/Vac		DC
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 110 Vdc/Vac		DD
4 DI / 3 DO Electromechanical		DG
(2 Form C, 1 Form B) 220 Vdc/Vac 4 DI / 3 DO Electromechanical		
(2 Form C, 1 Form B) 250 Vdc/Vac		D H
8 DO Electromechanical (Form A)		2 A
8 DO Electromechanical (Form B)		2 B
8 DO Electromechanical (6 Form A, 2 Form B)		2 C
8 DO Electromechanical (2 Form A, 6 Form B)		2 D
8 DO Electromechanical (4 Form A, 4		2 G
Form B) 8 DI 125 Vdc/Vac		3 A
8 DI 24 Vdc/Vac		3 B
8 DI 48 Vdc/Vac		3 C
8 DI 110 Vdc/Vac		3 0
8 DI 220 Vdc/Vac		3 G
8 DI 250 Vdc/Vac		3 H
14 DI 125 Vdc/Vac		4 A
14 DI 24 Vdc/Vac		4 8
14 DI 48 Vdc/Vac		4 C
14 DI 110 Vdc/Vac		4 D
14 DI 220 Vdc/Vac		4 G
14 DI 250 Vdc/Vac		4 H
8 AI (±20 mA or ±10 V Range)		5 X
4 AI / 4 AO (±20 mA or ±10 V Selectable)		6 X
Slot D Slot D Digital Input Vo	ltage	

Slot D | Slot D Digital Input Voltage o Only one (1) 3 DI / 4 DO / 1 AO card per chassis o Only one (1) 4 AI / 4 AO card per chassis

Empty 0 X	

3 DI / 4 DO / 1 AO (4-20 mA Range) 125 Vdc/Vac		ВА	
3 DI / 4 DO / 1 AO (4-20 mA Range) 24 Vdc/Vac		ВВ	
3 DI / 4 DO / 1 AO (4-20 mA Range) 48 Vdc/Vac		ВС	
3 DI / 4 DO / 1 AO (4-20 mA Range) 110 Vdc/Vac		BD	
3 DI / 4 DO / 1 AO (4-20 mA Range) 220 Vdc/Vac		BG	
3 DI / 4 DO / 1 AO (4-20 mA Range) 250 Vdc/Vac		ВН	
4 DI / 4 DO Electromechanical 125 Vdc/Vac		1 A	
4 DI / 4 DO Electromechanical 24 Vdc/Vac		1 B	
4 DI / 4 DO Electromechanical 48 Vdc/Vac		1 C	
4 DI / 4 DO Electromechanical 110 Vdc/Vac		1 D	
4 DI / 4 DO Electromechanical 220 Vdc/Vac		1 G	
4 DI / 4 DO Electromechanical 250 Vdc/Vac		1 H	
4 DI / 4 DO Fast High Current Hybrid 125 Vdc/Vac		СА	
4 DI / 4 DO Fast High Current Hybrid 24 Vdc/Vac		СВ	
4 DI / 4 DO Fast High Current Hybrid 48 Vdc/Vac		CC	
4 DI / 4 DO Fast High Current Hybrid 220 Vdc/Vac*		CG	
4 DI / 4 DO Fast High Current Hybrid 250 Vdc/Vac*		СН	
4 DI / 4 DO Fast High Current Hybrid 110 Vdc/Vac*		CD	
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 125 Vdc/Vac*		DA	
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 24 Vdc/Vac*		D B	
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 48 Vdc/Vac*		DC	
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 110 Vdc/Vac*		DD	
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 220 Vdc/Vac*		DG	
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 250 Vdc/Vac*		DH	
8 DO Electromechanical (Form A)*		2 A	
8 DO Electromechanical (Form B)*		2 B	
8 DO Electromechanical (6 Form A, 2 Form B)*		2 C	
8 DO Electromechanical (2 Form A, 6 Form B)*		2 D	
8 DO Electromechanical (4 Form A, 4 Form B)*		2 G	
8 DI 125 Vdc/Vac*		3 A	
8 DI 24 Vdc/Vac*		3 B	
8 DI 48 Vdc/Vac*		3 C	
8 DI 110 Vdc/Vac*		3 D	
8 DI 220 Vdc/Vac*		3 G	
8 DI 250 Vdc/Vac*		3 H	
14 DI 125 Vdc/Vac*		4 A	

14 DI 24 Vdc/Vac*	4 B
14 DI 48 Vdc/Vac*	4 C
14 DI 110 Vdc/Vac*	4 D
14 DI 220 Vdc/Vac*	4 G
14 DI 250 Vdc/Vac*	4 H
8 AI (\pm 20 mA or \pm 10 V Range) *	5 X
4 AI / 4 AO (±20 mA or ±10 V Selectable) *	6 X

Slot E | Slot E Digital Input Voltage o Only one (1) 3 DI / 4 DO / 1 AO card per chassis

o Only one (1) 4 AI / 4 AO card per cha	
Empty	0 X
3 DI / 4 DO / 1 AO (4-20 mA Range) 125 Vdc/Vac*	BA
3 DI / 4 DO / 1 AO (4-20 mA Range) 24 Vdc/Vac*	BB
3 DI / 4 DO / 1 AO (4-20 mA Range) 48 Vdc/Vac*	BC
3 DI / 4 DO / 1 AO (4-20 mA Range) 110 Vdc/Vac*	BD
3 DI / 4 DO / 1 AO (4-20 mA Range) 220 Vdc/Vac*	BG
3 DI / 4 DO / 1 AO (4-20 mA Range) 250 Vdc/Vac*	ВН
4 DI / 4 DO Electromechanical 125 Vdc/Vac*	1 A
4 DI / 4 DO Electromechanical 24 Vdc/Vac*	1 B
4 DI / 4 DO Electromechanical 48 Vdc/Vac*	1 C
4 DI / 4 DO Electromechanical 110 Vdc/Vac* 4 DI / 4 DO Electromechanical	1 D
220 Vdc/Vac* 4 DI / 4 DO Electromechanical	1 G
250 Vdc/Vac* 4 DI / 4 DO Fast High Current Hybrid	1 H
125 Vdc/Vac* 4 DI / 4 DO Fast High Current Hybrid	C A C B
24 Vdc/Vac* 4 DI / 4 DO Fast High Current Hybrid	CC
48 Vdc/Vac* 4 DI / 4 DO Fast High Current Hybrid	CD
110 Vdc/Vac* 4 DI / 4 DO Fast High Current Hybrid	CG
220 Vdc/Vac* 4 DI / 4 DO Fast High Current Hybrid	CH
250 Vdc/Vac* 4 DI / 3 DO Electromechanical	DA
(2 Form C, 1 Form B) 125 Vdc/Vac* 4 DI / 3 DO Electromechanical	DB
(2 Form C, 1 Form B) 24 Vdc/Vac* 4 DI / 3 DO Electromechanical	DC
(2 Form C, 1 Form B) 48 Vdc/Vac* 4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 110 Vdc/Vac*	
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 220 Vdc/Vac*	DG
4 DI / 3 DO Electromechanical (2 Form C, 1 Form B) 250 Vdc/Vac*	DH
8 DO Electromechanical (Form A)*	2 A
8 DO Electromechanical (Form B)*	2 B

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8 DO Electromechanical							_	<u> </u>					
(6 Form A, 2 Form B)*							2	С					
8 DO Electromechanical (2 Form A, 6 Form B)*							2	D					
8 DO Electromechanical (4 Form A, 4 Form B)*							2	G					
8 DI 125 Vdc/Vac*							3	Α					
8 DI 24 Vdc/Vac*							3	В					
8 DI 48 Vdc/Vac*							3	С					
8 DI 110 Vdc/Vac*							3	D					
8 DI 220 Vdc/Vac*							3	G					
8 DI 250 Vdc/Vac*							3	Н					
14 DI 125 Vdc/Vac*							4	Α					
14 DI 24 Vdc/Vac*							4	В					
14 DI 48 Vdc/Vac*							4	С					
14 DI 110 Vdc/Vac*							4	D					
14 DI 220 Vdc/Vac*							4	G					
14 DI 250 Vdc/Vac*							4	Н					
8 AI (±20 mA or ±10 V Range) *							5	Х					
4 AI / 4 AO (\pm 20 mA or \pm 10 V Selectable) *							6	Χ					
8 Arc-Flash Detection Inputs o To achieve 2-5 ms operate times for Arc- Flash Protection a 4 DI / 4 DO Fast High Current Interrupting Card is required							7	7					
Slot Z Current and Voltage Inp	utc												
3-Phase 1 Amp AC Current Input / 1 Amp Neutral AC Current Input / 3- Phase AC Voltage (300 Vac) (SELECT 4 ACI / 3 AVI)								8	1				
3-Phase 1 Amp AC Current Input / 5 Amp Neutral AC Current Input / 3- Phase AC Voltage (300 Vac) (SELECT 4 ACI / 3 AVI)								8	2				
3-Phase 1 Amp AC Current Input / 200								8	3				
mA Neutral AC Current Input / 3-Phase AC Voltage (300 Vac) (SELECT 4 ACI / 3 AVI)													
3-Phase 5 Amp AC Current Input / 5 Amp Neutral AC Current Input / 3- Phase AC Voltage (300 Vac) (SELECT 4 ACI / 3 AVI)								8	5				
3-Phase 5 Amp AC Current Input / 1 Amp Neutral AC Current Input / 3- Phase AC Voltage (300 Vac) (SELECT 4 ACI / 3 AVI)								8	6				
3-Phase 5 Amp AC Current Input / 200 mA Neutral AC Current Input / 3-Phase AC Voltage (300 Vac) (SELECT 4 ACI / 3 AVI)								8	7				
Resistor High-Impedance Module													
None											0		
2 kohm											1		
1 kohm											2		
.5 kohm											3		

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86 Bypass Relay

86 Bypass Rela High-Impedance Mo																							
None																					0		
Yes o Power Supply Volt Impedance Module Slot A power supply	will be the same as																				1		
Mounting																							
Panel Mount	el Mount Hardware, 37Z)																					1	
Rack Mount (SEL-HZM Wired to Bezel)	SEL-787Z in 19 inch																					2	
Surface Mount (SEL-HZM With Sur Hardware not Wired																						3	
Conformal Coat	:																						
None																						()
Conformal Coated C	Circuit Boards																						
Accessories																							
Accessories																							
	Terminal Block Cover for SEL 700 Series (Slot Z)	9 1	5 9	0	0 6	0 1																	
	Rack-Mount Bracket for Two SEL-700 Series Products (Steel)	9 1	5 9	0	0 6	0 9																	
Literature																							
	Instruction Manual for SEL-787Z	PM	7 8	3 7	Z -	0 1																	
	Instruction Manual for SEL-787Z (CD)	РМ	7 8	3 7	Z -	0 1	- ()														
SEL Cables																							
	SEL-C222 Serial Cable for Modem (RS-232, DTE-DCE, DB9 M/DB25 M, Hardware Flow Control)*	Pleas	e see	. Onl	ine M	10T d	or co	onta	ct Si	EL F	REP	or C	SR	for	orde	erin	ıg ir	nfor	mat	ion.			
	SEL-C227A Serial Cable for PC (RS- 232, DTE-DTE, DB9 M/DB25 F, Hardware Flow Control)*	Pleas	e see	: Onl	ine M	10T d	or co	onta	ct SI	EL F	REP	or C	SR	for	orde	erin	ıg ir	nfor	mat	ion.			
	SEL-C234 Serial Cable (RS-232, DTE-DTE, DB9 M/DB9 F)*	Pleas	e see	: Onl	ine M	10T d	or co	onta	ct S	EL F	REP	or C	SR	for	orde	erin	ıg ir	nfor	mat	ion.			
	Hardware Flow Control)*	Pleas	e see	· Onl	ine M	10T c	or co	onta	ct S	EL F	REP	or C	SR	for	orde	erin	ıg ir	nfor	mat	ion.			
	SEL-C273 Serial Cable (RS-232, DTE-DTE, DB9 M/DB9 M, IRIG-B)*	Pleas	e see	: Onl	ine M	10T c	or co	onta	ct S	EL F	REP	or C	SR	for	orde	erin	ıg ir	nfor	mat	ion.			

SEL-C804 Multimode Fiber- Optic Arc-Flash Detection (AFD) Sensors*	Please see Online MOT or contact SEL REP or CSR for ordering information.
SEL-C805 Fiber- Optic Cable (200 um, Multimode)*	Please see Online MOT or contact SEL REP or CSR for ordering information.
SEL-C807 Fiber- Optic Cable (62.5/200 um, Multimode)*	Please see Online MOT or contact SEL REP or CSR for ordering information.
SEL-C808 Fiber- Optic Cable (62.5/125 um, Multimode)*	Please see Online MOT or contact SEL REP or CSR for ordering information.
SEL-C814 Arc-Flash Detection (AFD) Fiber Cables and Accessories (configurable length and number of splices)*	Please see Online MOT or contact SEL REP or CSR for ordering information.
SEL-CA605 Ethernet Cable (RJ45 M/RJ45 M)*	Please see Online MOT or contact SEL REP or CSR for ordering information.

Additional Information

- Base unit includes slots A, B (EIA-232), Z, HMI, and Front EIA-232 Port.
- The protocols SNTP, IEEE 1588-2008 firmware-based PTP and Modbus TCP are included in the standard offering with Single Ethernet option.
- The protocols SNTP, IEEE 1588-2008 firmware-based PTP, PRP, and Modbus TCP are included in the standard offering with a Dual Ethernet option.
- DNP3 LAN/WAN are included with DNP3 and Ethernet option.
- Download ACSELERATOR QuickSet SEL-5030 software for free at https://www.selinc.com/softwaresolutions/. ACSELERATOR QuickSet on CD (503001WX4) is available upon request.
- The SEL-787Z manual is available at selinc.com. One complimentary instruction manual CD and one printed instruction manual are available upon request.
- A configuration kit is provided for the front panel configurable labels (packaged in the shipping box). For additional kits, order SEL part number 9260136 (2 sheet kit) or 9260137 (25 sheet kit).
- For additional remote I/O capability, order SEL-2505 Remote I/O Module that is SEL-2812 compatible (ST option only).
- The SEL-787Z option cards are orderable separately for field installation.
- For Arc-Flash Detection Standard Point Sensors, Window Point Sensor, Bare-Fiber Sensors, or Cable Accessories, see SEL-C804 Multimode Fiber-Optic Arc-Flash Detection (AFD) Sensors and C814 Arc-Flash Detection (AFD) Fiber Cables and Accessories.
- For relay wire termination kits, please see Application Note AN2014-08 on the SEL website or contact SEL REP or CSR for ordering information.
- For SEL-787Z Mounting Accessories including adapter plates, dust protectors, etc go to https://selinc.com/applications/mountingselector/.
- ACSELERATOR Bay Screen Builder SEL-5036 software is available with touchscreen models.
- All Digital Outputs are Form-A unless noted otherwise.
- $\bullet \ \mathsf{SEL}\text{-}787Z \ \mathsf{when} \ \mathsf{ordered} \ \mathsf{With} \ \mathsf{SEL}\text{-}\mathsf{HZM} \ \mathsf{option} \ \mathsf{will} \ \mathsf{include} \ \mathsf{7.5kJ/850V} \ \mathsf{Energy} \ \mathsf{Clamping} \ \mathsf{MOV}.$
- Conformal coating is not available for SEL-HZM when SEL-HZM is selected With 86 Bypass Relay.

Making Electric Power Safer, More Reliable, and More Economical ®

SEL SCHWEITZER ENGINEERING LABORATORIES, INC.

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